

WHAT IS CLAIMED IS:

1. A duplexer comprising
two surface acoustic wave filters that are formed
5 on one substrate, at least one of the two surface
acoustic wave filters being a ladder filter,
wherein
the positional difference between the centers in
a surface acoustic wave propagating direction of each
10 two neighboring comb-like electrodes among comb-like
electrodes that form series-arm resonators in the
ladder filter is equal to or smaller than a fourth of
the length in the propagating direction of the comb-
like electrode having the larger number of pairs of
15 electrode fingers of each two neighboring comb-like
electrodes.
2. The duplexer as claimed in claim 1,
wherein:
20 the number N of comb-like electrodes that form
the series-arm resonators is three or greater, N being
an integer; and
the positional difference is equal to or smaller
than a fourth of the length in the propagating
25 direction of the comb-like electrode having the larger
number of pairs of electrode fingers of each two
neighboring comb-like electrodes, among at least (N-2)
pairs of neighboring comb-like electrodes.
- 30 3. The duplexer as claimed in claim 1,
wherein:
a first straight line connecting an input
terminal integrally formed with the comb-like electrode
forming the input-stage series-arm resonator of the
35 ladder filter to an output terminal integrally formed
with the comb-like electrode forming the output-stage
series-arm resonator of the ladder filter deviates from

the straight line extending perpendicularly to the propagating direction, so that the angle of the first straight line with respect to a second straight line connecting an input terminal to an output terminal
5 provided in a package that accommodates the substrate is smaller than the angle of the second straight line with respect to the straight line extending perpendicularly to the surface acoustic wave propagating direction on the substrate.

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4. A duplexer comprising
two surface acoustic wave filters that are formed on one substrate, at least one of the two surface acoustic wave filters being a ladder filter,

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wherein
comb-like electrodes that form series-arm resonators in the ladder filter are arranged in the direction perpendicular to a surface acoustic wave propagating direction; and

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a first straight line connecting an input terminal integrally formed with the comb-like electrode forming the input-stage series-arm resonator of the ladder filter to an output terminal integrally formed with the comb-like electrode forming the output-stage
25 series-arm resonator of the ladder filter deviates from the straight line extending perpendicularly to the propagating direction, so that the angle of the first straight line with respect to a second straight line connecting an input terminal to an output terminal
30 provided in a package that accommodates the substrate is smaller than the angle of the second straight line with respect to the straight line extending perpendicularly to the surface acoustic wave propagating direction on the substrate.

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5. The duplexer as claimed in claim 4, wherein, with the ladder filter being divided into two parts by

the first straight line, the difference in the number of comb-like electrodes forming parallel-arm resonators between the two parts is two or greater.

5 6. A duplexer comprising

two surface acoustic wave filters that are formed on one substrate, at least one of the two surface acoustic wave filters being a ladder filter,

wherein

10 a first straight line connecting the center of a comb-like electrode forming the input-stage series-arm resonator of the ladder filter to the center of a comb-like electrode forming the output-stage series-arm resonator of the ladder filter deviates from the
15 straight line extending perpendicularly to a surface acoustic wave propagating direction, so that the angle of the first straight line with respect to a second straight line connecting an input terminal and an
20 output terminal provided in a package that accommodates the substrate is smaller than the angle of the second straight line with respect to the straight line extending perpendicularly to the surface acoustic wave propagating direction on the substrate.

25 7. The duplexer as claimed in claim 6, wherein a comb-like electrode forming the input-stage parallel resonator of the ladder filter and a comb-like electrode forming the output-stage parallel-arm resonator are arranged on opposite sides of the
30 straight line connecting comb-like electrodes that form the series-arm resonators of the ladder filter.

8. A duplexer comprising:

35 two surface acoustic wave filters that are formed on one substrate; and

a ground electrode that is provided between the two surface acoustic wave filters on the substrate.

9. The duplexer as claimed in claim 8, wherein
the ground electrode has a length equal to or longer
than a half of the length of each facing side of the
5 two surface acoustic wave filters facing each other.

10. The duplexer as claimed in claim 8, wherein
the ground electrode has a length equal to or longer
than each facing side of the two surface acoustic wave
10 filters facing each other, the ground electrode being
located in such a position as to completely shut off
the two surface acoustic wave filters from each other.

11. The duplexer as claimed in claim 1, wherein
15 the substrate is a rotated Y-cut X-propagation lithium
tantalate substrate.